Space Weather Forecast

Issued on Saturday, 24 February 2024 at 13:14 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate flares expected with a chance of Strong flares and slight chance of associated solar radiation storms. Chance of G1/Minor geomagnetic storm mainly on day 2 (25 Feb).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: High activity with seven Moderate flares observed (all producing R1 Radio Blackouts), from the large spot in the north-centre disc, which was the source of three Strong flares on 21-22 Feb. There are five numbered spots, however this region remains the largest on the disc, by far. Despite its size and activity, the complexity of the region remains relatively limited compared to what would typically be expected. However, growth of an intermediate spot has resulted in this joining up with the opposite polarity leader spot, leading to some complexity developing, while further opposite magnetic polarity spots are also evident on the periphery of the large leader spot. The other regions are much smaller and simpler, with no significant growth observed.

There were no Earth directed coronal mass ejections (CMEs) observed.

Solar Wind / Geomagnetic Activity: Solar winds have been at background 300-350 km/s. Total Interplanetary Magnetic field (IMF) strength was weak, with the north-south component showing periods of weak positive (northward) field and weak negative (southward) field. Geomagnetic activity was Quiet (Kp 0-2).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was very slightly above background due to the lingering effects of the previous enhancements that started on 09 Feb. However this remained well below the S1 Minor Solar Radiation Storm level.

Four-Day Space Weather Forecast Summary

Solar Activity: Activity is forecast to remain Moderate to High, with occasional Moderate class flares expected and a chance of further isolated X-class flares from the large sunspot in the north-centre disc.

Solar Wind / Geomagnetic Activity: CME from 21 Feb may giving a glancing impact later on day 1 or early day 2 (24-25 Feb). Background solar winds are likely to become enhanced day 2, from the onset of the fast winds from a coronal hole, before peaking into day 3 (25-26 Feb). These fast winds easing day 4 (27 Feb). Quiet activity at first becoming Unsettled to Active with a chance of G1 Minor Storms from any coronal hole fast wind onset, or any CME glance that occurs. These most likely day 2 (25 Feb), if any combined arrival occurs. Quiet to Unsettled activity returning day 4 (27 Feb).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to continue easing towards background, but with a chance of becoming re-enhanced due to any significant flares from the large sunspot on the disc. This risk increasing slightly from day 2 (25 Feb) as the region moves into the western hemisphere, giving a chance of S1 Minor Radiation storms, and a very slight chance of strong storms occurring.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	30	20	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	80	75	70	60
Very Active	R3 to R5 X	No	30	25	20	15

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	20	25	25
Very Active	≥ S3 *	No	1	5	5	5

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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